Rancho La Costa
Habitat Conservation Area

A Dedicated Natural Open Space System Set Aside as part
of the La Costa Villages, University Commons and
Cassia Professional Offices Developments
and also includes the "Nelson" parcel.

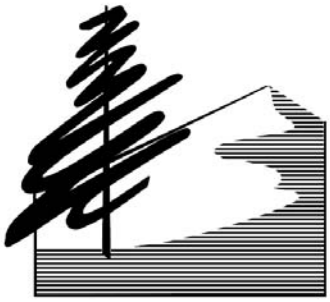
(S016, S020, S022, S026 and S036)

Annual Work Plan

October 2008 - September 2009

Prepared for:

U.S. Fish and Wildlife Service
California Department of Fish and Game
City of Carlsbad
City of San Marcos
San Diego County



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October 1, 2008

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I. INTRODUCTION AND SUMMARY

This annual work plan has been developed from the guidelines for goals and objectives set forth in the Habitat Management Plan for the Rancho La Costa Habitat Conservation Area (Plan) dated May 2005 (CNLM 2005). The Plan includes management requirements agreed to by the United States Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG), and additional management activities that the Center for Natural Lands Management (Center) feels are appropriate to protect and maintain the natural resources in perpetuity. The Center holds fee title and conservation easements (CE) to the Rancho La Costa Habitat Conservation Area (HCA) and performs or oversees the tasks identified in the Plan.

The HCA was created by combining several areas, which were dedicated to the Center for long term management from the La Costa Villages, University Commons and Cassia Professional Offices (Cassia) developments. The Cassia property, which is approximately 1 acre, was added in January of 2007 and lies adjacent to the 'Greens' property of La Costa Villages.

Each development dedicated several parcels that have been identified in the past by various names or associations. The La Costa Villages project dedicated parcels referred to as the Oaks, Ridges, Greens, Choumas-Pappas, and Alemir, of which the former three are located in Carlsbad, and the latter two are located in the County of San Diego. The University Commons project dedicated parcels referred to as the "on-site parcels", Frank's Peak, Pfau (CE), Huff, Wilern, Winston, Setter and Elfin Forest (CE). The Elfin Forest parcels are located both on-site (San Marcos) and within the County of San Diego. The Setter parcel is within the County of San Diego. All the other University Commons parcels are located within the City of San Marcos. The Nelson parcel was purchased by the National Fish and Wildlife Foundation and deeded to the Center. This parcel is located in the County of San Diego.

As of October 2007, the Center owns or holds CEs on all the properties set aside by these developments. The entire HCA is also completely funded.

The purpose of this work plan is to identify the tasks and budget required to complete the management activities for this management year, which will begin on October 1, 2008 and end on September 30, 2009. Unless otherwise stated, all tasks will be performed by the Center's Area Manager, Markus Spiegelberg, and Preserve Managers, Jessica Vinje and Patrick McConnell.

Summary of Tasks and Goals for the 2008-2009 Fiscal Year:

- Replace and install signs in several locations, fix fencing as necessary, and install new fence on an as-needed basis.
- Note all animal species observed and map locations of any sensitive species.
- Monitor wildlife corridors using digital cameras.
- Conduct vegetation sampling at permanent plots within the thread-leaved brodiaea (*Brodiaea filifolia*) populations.

- Count individuals and control weeds in the San Diego thornmint (*Acanthomintha ilicifolia*) population. Develop a vegetation monitoring program to assess the quality of the habitat within and adjacent to the thornmint populations.
- Set up and collect data from vegetation monitoring transects within coastal sage scrub (CSS) located on the HCA.
- Map and survey for the following sensitive plant species: southwestern spiny rush (*Juncus acutus* ssp. *leopoldii*), San Diego marsh-elder (*Iva hayesiana*), San Diego sagewort (*Artemisia palmeri*), San Diego goldenstar (*Bloomeria clevelandii*), Palmer's grapplinghook (*Harpagonella palmeri*), and Orcutt's hazardia (*Hazardia orcuttii*).
- Grow San Diego thornmint and thread-leaved brodiaea plants from seeds collected from HCA populations.
- Monitor and assess the health of coast live oak trees.
- Remove nonnative plant species, especially perennial pepperweed (*Lepidium latifolium*), onion weed (*Asphodelus fistulosus*), Ward's weed (*Carrichtera annua*), pampas grass (*Cortaderia* spp.), and tamarisk (*Tamarix* spp.).
- Control weeds growing in the transplanted Orcutt's brodiaea (*Brodiaea orcuttii*) population using a combination of weed treatments.
- Continue the onion weed herbicide experiments with the University of California at Davis, Agriculture Extension.
- Continue to hand water container plants that were installed in 2008 on the Huff parcel and on an eroded trail that was restored located on Denk Mountain.
- Maintain and monitor the Huff restoration site and install 500 container plants within the restoration areas.
- Coordinate with Homeowner's Associations (HOAs) on HCA issues and coordinate public outreach events and prepare public outreach literature.
- Coordinate with trail volunteers, Eagle Scouts, and the San Diego Mountain Biking Association to accomplish HCA projects.
- Mow and clear fuel breaks.
- Slow erosion on Denning Road using gravel bags.
- Patrol and conduct site enforcement on a regular basis.
- Begin the preparation of "position papers" for certain City of Carlsbad Covered Species (plants and animals).
- Report and describe data collected and management actions taken on the HCA to the wildlife agencies.
- Conduct CE compliance monitoring and prepare reports.
- Provide an accounting of funds to be spent in the next fiscal year.

Appendix 1 (*Field Schedule*) identifies the approximate schedule of field work throughout the management year. Appendix 2 (*Annual Budget*) provides a financial summary for both staff time and costs for the year. Maps of the HCA are located in Appendix 3.

II. MANAGEMENT ACTIVITIES

The following sections identify and describe the activities to be performed during this management year. Based upon the Property Analysis Record (PAR) developed by the Center to outline long-term management tasks and costs, management activities for the HCA can be

categorized into several groups: Capital Improvements, Biological Surveys, Habitat Maintenance and Restoration, Public Services, Reporting, Office Maintenance, and Operations. Each of these categories will be discussed below.

A. CAPITAL IMPROVEMENTS

Fencing and signing are the only capital improvements to be undertaken during the upcoming management year.

1. Fencing The Center will construct barbed wire fencing or other appropriate types of fencing in several locations throughout the HCA as needed in areas where the public is trespassing. Most likely these fence locations will include illegal trails that were created in the Choumass-Pappas, Huff, and Denk Mountain areas.

2. Signing Center signs have been posted at all of the major access points to the HCA. Additional signs will be installed in other strategic locations throughout the HCA. Each sign explains that the HCA is a dedicated open space, and that off-highway vehicle (OHV) activity, dumping and shooting are prohibited.

B. BIOLOGICAL SURVEYS

The following section outlines monitoring activities planned for the next fiscal year. All data will be entered or stored in Geographic Information System (GIS) and/or MSAccess/excel databases. A brief description of monitoring activities outlined by taxa is provided below:

1. Vegetation Sampling in Thread-leaved Brodiaea Populations One of the Center's goals is to track vegetation variables within the native and non-native grass areas (Greens) that are known to support thread-leaved brodiaea. The Center's objective is to increase, or protect a stable mean density, of thread-leaved brodiaea and decrease the percent cover of nonnative grasses, specifically purple-false brome (*Brachypodium distachyon*). Appendix 4 (Research Proposal for the Herbicide Application of Fusilade to Thread-leaved Brodiaea [*Brodiaea filifolia*]) describes the vegetation sampling proposal. The second year of data collection occurred during the 2007-2008 fiscal year and the third year of data collection and herbicide application will occur during this upcoming fiscal year.

2. Vegetation Sampling in San Diego thornmint Populations A monitoring methodology will be established to monitor the San Diego thornmint population located at the Greens. Specifically, a stratified random sampling methodology will be employed within the population to collect data on percent cover, abundance, and diversity of native and non-native plant species. Monitoring transects will be randomly placed within the previously demarcated boundaries of the population and quadrats will be randomly placed along the transects and data will be collected within each quadrat. Removal of non-native species will begin after data collection and the methodology will be repeated each year to track the changes in percent cover, abundance and diversity. Management of the population will be modified if necessary based on the results of the annual monitoring.

3. Long-term CSS Monitoring As per the Plan, the Center has a goal of setting up long-term CSS monitoring areas to track changes in the CSS community. In 2005, we set up vegetation transects stratified by fire history, distance from edge and vegetation sub-association. We used those data to direct our current action and plan (Appendix 5). We will be establishing our CSS plots per the CSS monitoring plan and conducting the monitoring within these plots in the spring of 2009.

4. Sensitive Plant Species

The HCA supports more than 10 sensitive plant species. The location and abundance of each of these species was mapped and counted in 2003 and some were again mapped and counted in 2008. These surveys are repeated every three to five years depending on the species (see Plan). During this upcoming fiscal year, we will map and conduct focused surveys for thread-leaved brodiaea, San Diego thornmint, southwestern spiny rush, San Diego marsh-elder, San Diego sagewort, San Diego goldenstar, Palmer's grapplinghook, and Orcutt's hazardia. We will use a hand-held Global Positioning System device for most species. Additionally, during all patrol and survey activities, a plant species list will be created and added to the master plant species list at the end of the year.

5. Oak Woodland Monitoring One long-term monitoring plot will be set up and monitored within the oak woodlands during the summer of 2009. Partial to complete die-back has begun to occur in some of the coast live oak (*Quercus agrifolia*) woodlands in Carlsbad, and these changes may be attributed to an oak boring beetle, though we are unsure at this time as to the cause. The Center will track changes in canopy cover, mortality, recruitment, number trees infected among the live oaks, and concurrently measure species richness and ground cover.

6. Wildlife

The Center will monitor wildlife movement in several locations in the HCA using digital remote sensing cameras. These cameras will be placed in strategic locations throughout the HCA that were chosen during previous years. The Center will be able to track wildlife movement through designated and potential wildlife corridors using these cameras. Additionally, during all patrol and survey activities, a wildlife species list will be created and added to the master wildlife species list at the end of the year.

C. HABITAT MAINTENANCE AND RESTORATION

1. Habitat maintenance Habitat maintenance will continue during this upcoming fiscal year. Since 2002, many nonnative plants and acreage infested by nonnative plants has been treated by CNLM. The following nonnative removal projects will occur in the upcoming fiscal year:

- We will drill and fill, or cut and stump spray, eucalyptus (*Eucalyptus* spp.) trees in various locations throughout the HCA.
- We will treat fennel (*Foeniculum vulgare*), artichoke thistle (*Cynara cardunculus*), perennial pepper weed, onion weed, Ward's

weed, pampas grass, tamarisk, ice plant (*Carpobrotus* spp.), tree tobacco (*Nicotiana glauca*), and palms (*Phoenix canariensis* and *Washingtonia* spp.) at the Greens and in other various locations throughout the HCA.

- We will treat weeds growing in the Huff restoration area.
- We will continue to treat about ½ acre of pampas grass at the Brouwer parcel; ½ acre of pampas grass located west of Melrose Avenue; and all of the pampas grass located on the Greens parcel as resprouts are observed.
- We will treat fountain grass (*Pennisetum setaceum*), castor bean (*Ricinus communis*), and acacia (*Acacia* spp.) resprouts along the old Rancho Santa Fe Road.
- We will treat all of the nonnative plants that are growing in the Orcutt's brodiaea transplantation site at the Winston parcel using a pre-emergent herbicide and follow up post emergent spot applications.
- We will control using a weed whacker, the nonnative annual weeds that are growing in the San Diego thornmint population at the Greens.

Additionally, gravel bags will be purchased and placed in large gullies and rills located on Denning Road, the dirt road leading up the north facing slope of Denk Mountain. These gravel bags will slow erosion and help to stabilize the existing road and associated trail.

2. **Habitat Restoration** During the 2006 fiscal year the Center began restoring the former mulch facility area at the Huff parcel. We hydro-seeded the area with a native CSS mix and planted approximately 100 coast live oak trees in the fall and winter of 2005. We also installed an irrigation system on one-third of the area in 2006 and we installed approximately 100 container plants in the middle section of the restoration area in 2008. We will continue to water the container plants that were installed in 2008. Additionally, irrigation was installed in the southern portion of the site in late 2008 and an additional 500 container plants will be planted in this section in late 2008 or early 2009.

   During the 2007-2008 fiscal year, we restored an eroded trail and revegetated it with approximately 100 native container plants. We have been watering these container plants by hand and will continue to do so until the plants are able to survive without supplemental water.

   In coordination with University of California at Davis, Agriculture Extension, we established herbicide experiments during the 2005-2006, 2006-2007, and 2007-2008 fiscal years. These experiments were established to determine the effectiveness of herbicides on the invasive and nonnative plant, onion weed. We will continue these experiments in coordination with the University of California at Davis, Agriculture Extension during this next fiscal year.

CNLM also plans to grow San Diego thornmint and thread-leaved brodiaea plants from seed collected during the 2008 spring season from the HCA populations. The seed will be grown in flats containing native soil. These flats will be placed within the HCA and will be hand watered. The seed from the San Diego thornmint plants will then be collected and scattered back into suitable habitat within the HCA and the thread-leaved brodiaea corms will be transplanted into suitable habitat within the HCA. The areas chosen will be areas already supporting San Diego thornmint and thread-leaved brodiaea so as to ensure successful restoration and/or transplantation.

We will be mowing and clearing several fuel management areas adjacent to homes that border the HCA. We will be using hired contract crews to accomplish this work.

D. PUBLIC SERVICES

Public services activities include patrolling of the HCA and the response to emergencies. However, other opportunities for public service will undoubtedly be forthcoming during the year, such as a spring nature walk, local groups and individuals interested in volunteering labor for HCA projects, and class field trips from local schools. We will accommodate these activities whenever possible.

1. **Patrols** Patrols will be performed approximately once to twice per week.

2. **Emergency Response** Staff time has been allocated from the current budget for management to respond to emergencies on the HCA. Such emergencies could include response to wildfires, wildlife problems reported by neighbors and trespass.

3. **Nature Walks/Outreach/Trails**. During this fiscal year, the Center will be maintaining a newly created trail near the Setter and questhaven parcels and blocking off unwanted and illegal trails on Denk Mountain and in the Box Canyon area. We will also be working with a local mountain biking group (San Diego Mountain Biking Association) to maintain existing trails and with HOAs on HCA issues. Additionally, we will be coordinating public outreach events and preparing public outreach literature for the HOAs and lastly, we will be working with local Eagle Scouts to accomplish HCA projects.

E. REPORTING

Activities included within reporting requirements include the management of the HCA's database/GIS system, the photo-documentation stations, and the production of various status reports to the USFWS, CDFG and Center administration.

1. Database/GIS Management

Data derived from routine patrols and photo-documentation will be entered into and maintained in the HCA's existing database/GIS system. Additional databases will be established for the various biotic monitoring programs including the production of historical and current vegetation maps. Efforts will be made to coordinate and standardize database fields and parameters with other reserves.

2. Photo-documentation Stations

Photo-documentation stations were created in 2003 and 2004. Photos will be taken at these stations every three years and were last taken in 2006. We will take photos of various activities during the fiscal year, including nonnative removal tasks, public outreach events and/or any vandalism that we observe.

3. Reports

a. **Year-End/Agency Reports** By December 15, 2009, a year-end report will be prepared by the Preserve manager detailing the results of the year's management activities. This report will include recommendations for the continuation of various activities for the following fiscal year and will be submitted to the County of San Diego, City's of San Marcos and Carlsbad, the USFWS and the CDFG as required under permit reporting conditions.

b. **Annual Work Plan** The work plan for the 2009-2010 fiscal year will be formulated by the end of the 2008-2009 fiscal year and will be based upon experiences during previous years' operations. This work plan will be submitted to the County of San Diego, City's of San Marcos and Carlsbad, USFWS and CDFG.

c. **Management Plan** The management plan for the HCA was updated in June of 2005 and submitted to the County, City's of San Marcos and Carlsbad and the wildlife agencies. An updated management plan will be submitted in 2010.

d. **CE Compliance** The Center has a draft policy regarding baseline documentation of preserves where a CE exists and a standard form for this baseline documentation. A baseline report is prepared on a preserve, or on the portion where the CE exists, and then annual monitoring (or as often as needed) occurs to document any changes in the baseline condition. Time has been allocated for the HCA manager to monitor compliance of the CE portion of the HCA. This process insures CE's are being managed appropriately, and ensures continuity of process. Current CE's include the Pfau CE near Frank's peak, Lot 8 of University Commons and the Elfin on- and off-site properties.

e. **Position Paper Preparation** The Center is conducting rare plant and animal monitoring and research within our preserve system. Data are being collected and

compiled on these plants and animals. The Center has allocated funds to begin preparation of position papers for certain of the City of Carlsbad's Covered Species (plants and animals), primarily those that occur on CNLM properties. These papers will summarize the Multiple Habitat Conservation Program conservation and management goals and objectives and current population data, and will provide an outline of proposed management and monitoring goals and objectives. These position papers will be provided to the City of Carlsbad, their Preserve Steward and the wildlife agencies for review and comment.

F. OFFICE MAINTENANCE

HCA Management will maintain offices in an organized manner to facilitate maximum efficiency. This section of the budget includes outlays for general office work, utilities, and telephones, among other items/tasks.

G. OPERATIONS

Operations include the training and professional growth of Preserve Management personnel and inspection of the HCA by Center administration. Funds have been allocated in the current budget for both the Preserve Manager to attend classes or seminars during the fiscal year. Also included within this category of activity is the conduction of employee reviews.

III. WORKLOAD AND BUDGETS

A. SUPERVISION & STAFFING

The Area Manger, Markus Spiegelberg, will be supervised by the Center's Director of Conservation Science (DCS), Deborah Rogers. Tasks and hours will be coordinated by the Area Manager and approved by the DCS. Additionally, hours have been allocated for Ms. Rogers to assist with document reviewing and scientific research conducted on Center preserves. Mr. Spiegelberg will supervise the Preserve Managers, Jessica Vinje and Patrick McConnell.

B. BUDGETING

A budget has been prepared for the upcoming fiscal year and is included here as Appendix 2. Every effort will be made by the Center to allocate time and expenses according to this estimated budget. The budget for this fiscal year is (based on the interest generated from five endowments and the initial and capital from one project, Cassia Professional Offices): Nelson, La Costa Villages, University Commons (Brookfield Development), Cassia Professional Offices, and Elfin Forest (Scandia Development portion of University Commons) are: $3,508, $72,936, $31,433, $4,080, and 6,153 respectively.

IV. REFERENCES

CNLM 2005. Habitat Management Plan for the Rancho La Costa Habitat Conservation Area. June 2005.

IV. APPENDICES

Appendix 1: 2008-2009 Task Schedule

Task	October-December 2008	January-March 2009	April to June 2009	July to September 2009
Nonnative Plant Removal	X	X	X	X
Rare Plant and Coast Live Oak Vegetation Surveys	X	X	X	X
Establish and Monitor CSS Vegetation Plots			X	X
Wildlife Monitoring		X	X	
Restoration and Maintenance Activities	X	X	X	X
Clear Fuel Breaks			X	
GIS/Database	X			
Trails/Erosion	X	X	X	
Fencing/Signage	X	X	X	X
Patrolling	X	X	X	X
Reporting	X			X
Public outreach	X	X	X	X

Appendix 2: Annual Budgets 2008-2009

Budget Task Detail

Nelson

Annual Budget for Yr 2008-2009

Ongoing Expenses

09/22/2008

Task list	Specific Description	Unit	Reinvestment	Quantity	Rate	Num Yrs	Cost	Contingency	Administration	Total Cost
Biotic Surveys										
Plant Ecologist	CSS veg	L. Hours		12.00	33.15	1	397.80	0.00	95.47	493.27
Science Director	Coordination/Overs	L. Hours		3.00	50.00	1	150.00	0.00	36.00	186.00
Sub total							547.80	0.00	131.47	679.27
Field Equipment										
Power Tools	Misc. Tools	Item		1.00	10.00	1	10.00	0.00	2.40	12.40
Vehicle	Transportation	Mile		300.00	0.99	1	297.00	0.00	71.28	368.28
Sub total							307.00	0.00	73.68	380.68
Office Maintenance										
Office Rent	Rent	Item		1.00	52.08	1	52.08	0.00	12.49	64.57
Office Supplies,	Supplies	Item		1.00	27.00	1	27.00	0.00	6.48	33.48
Preserve Office	Office time	L. Hours		8.00	33.15	1	265.20	0.00	63.64	328.84
Telephone	Telephone	Item		1.00	29.00	1	29.00	0.00	6.96	35.96
Sub total							373.28	0.00	89.58	462.86
Operations										
Audit	Audit-cost share	Item		1.00	36.00	1	36.00	0.00	8.64	44.64
Employee Training	Retreat/conf	Item		1.00	27.00	1	27.00	0.00	6.48	33.48
Insurance	Liability/fee	Item		1.00	307.52	1	307.52	0.00	73.80	381.32
Project Accounting	Vac/sick/retreat/co	L. Hours		3.00	28.13	1	84.39	0.00	20.25	104.64
Project Accounting	Vac/sick/retreat/co	L. Hours		3.00	33.15	1	99.45	0.00	23.86	123.31
Project Accounting	Vac/sick/retreat/co	L. Hours		3.00	42.23	1	126.69	0.00	30.40	157.09
Sub total							681.05	0.00	163.45	844.50

NOTE: Because the values are rounded, there may be small errors.

Budget Task Detail

Nelson

Annual Budget for Yr 2008-2009

Ongoing Expenses

09/22/2008

Task list	Specific Description	Unit	Reinvestment	Quantity	Rate	Num Yrs	Cost	Contingency	Administration	Total Cost
Public Services										
Access Control	Enforcement	L. Hours		16.00	33.15	1	530.40	0.00	127.29	657.69
Sign	Access	Item		5.00	8.00	1	40.00	0.00	9.60	49.60
Sub total							570.40	0.00	136.89	707.29
Reporting										
Annual Reports	Summary	L. Hours		4.00	33.15	1	132.60	0.00	31.82	164.42
Annual Work Plan	Plan And Par	L. Hours		4.00	33.15	1	132.60	0.00	31.82	164.42
GIS/CAD Management	Data Management	L. Hours		2.00	42.23	1	84.46	0.00	20.27	104.73
Sub total							349.66	0.00	83.91	433.57
Sub Total for All Categories							2,829.19	0.00	679.00	3,508.19

NOTE: Because the values are rounded, there may be small errors.

Budget Task Detail

La Costa Villages

Annual Budget for Yr 2008-2009

Ongoing Expenses

09/22/2008

Task list	Specific Description	Unit	Reinvestment	Quantity	Rate	Num Yrs	Cost	Contingency	Administration	Total Cost
Biotic Surveys										
General Wildlife	Wildlife Camera	L. Hours		5.00	33.55	1	167.75	0.00	40.26	208.01
Plant Ecologist	ACIL plots surveys	L. Hours		8.00	33.55	1	268.40	0.00	64.41	332.81
Plant Ecologist	BRFI Veg Plots	L. Hours		40.00	28.13	1	1,125.20	0.00	270.04	1,395.24
Plant Ecologist	BRFI Veg Plots	L. Hours		40.00	33.55	1	1,342.00	0.00	322.08	1,664.08
Plant Ecologist	CSS Veg Plots	L. Hours		24.00	28.13	1	675.12	0.00	162.02	837.14
Plant Ecologist	CSS Veg Plots	L. Hours		24.00	33.55	1	805.20	0.00	193.24	998.44
Plant Ecologist	Iva, Spiny Rush,	L. Hours		16.00	33.55	1	536.80	0.00	128.83	665.63
Plant Ecologist	Muilla Surveys	L. Hours		8.00	33.55	1	268.40	0.00	64.41	332.81
Plant Ecologist	Oak assessment	L. Hours		6.00	33.55	1	201.30	0.00	48.31	249.61
Plant Ecologist	Orcutt's hazardia	L. Hours		5.00	33.55	1	167.75	0.00	40.26	208.01
Science Director	Coordination/Overs	L. Hours		15.00	55.00	1	825.00	0.00	198.00	1,023.00
Sub total							6,382.92	0.00	1,531.90	7,914.82
Field Equipment										
Field Clothes	Uniform	Item		1.00	42.00	1	42.00	0.00	10.08	52.08
Power Tools	Misc. Tools	Year		1.00	180.00	1	180.00	0.00	43.20	223.20
Vehicle	Transportation	Mile		5,000.00	0.99	1	4,950.00	0.00	1,188.00	6,138.00
Sub total							5,172.00	0.00	1,241.28	6,413.28
General Maintenance										
Sanitation Control	Dumpster	Month		1.00	103.00	1	103.00	0.00	24.72	127.72
Sub total							103.00	0.00	24.72	127.72

NOTE: Because the values are rounded, there may be small errors.

Budget Task Detail

La Costa Villages

Annual Budget for Yr 2008-2009

Ongoing Expenses

09/22/2008

Task list	Specific Description	Unit	Reinvestment	Quantity	Rate	Num Yrs	Cost	Contingency	Administration	Total Cost
Habitat Maintenance										
Erosion Control	Labor - Install	L. Hours		6.00	28.13	1	168.78	0.00	40.50	209.28
Erosion Control	Labor - Install	L. Hours		6.00	33.55	1	201.30	0.00	48.31	249.61
Erosion Control	Gravel Bags for	Unit		200.00	1.00	1	200.00	0.00	48.00	248.00
Exotic Plant Control	Backpack Spray -	L. Hours		20.00	28.13	1	562.60	0.00	135.02	697.62
Exotic Plant Control	Backpack Spray -	L. Hours		60.00	33.55	1	2,013.00	0.00	483.12	2,496.12
Exotic Plant Control	Spray Carrichtera	C. Hours		40.00	34.00	1	1,360.00	0.00	326.40	1,686.40
Exotic Plant Control	Spray Fountain	C. Hours		40.00	34.00	1	1,360.00	0.00	326.40	1,686.40
Exotic Plant Control	Spray Lepidium	C. Hours		80.00	34.00	1	2,720.00	0.00	652.80	3,372.80
Exotic Plant Control	Weed Whack ACIL	L. Hours		4.00	33.55	1	134.20	0.00	32.20	166.40
Exotic Plant Control	Herbicide	Gallon		3.00	175.00	1	525.00	0.00	126.00	651.00
Exotic Plant Control	Drill and Fill Eucs	L. Hours		8.00	28.13	1	225.04	0.00	54.00	279.04
Exotic Plant Control	Drill and Fill Eucs	L. Hours		8.00	33.55	1	268.40	0.00	64.41	332.81
Exotic Plant Control	Drill and Fill Eucs -	Day		1.00	11.00	1	11.00	0.00	2.64	13.64
Exotic Plant Control	Drill and Fill Eucs -	Day		1.00	40.00	1	40.00	0.00	9.60	49.60
Exotic Plant Control	Skid Spray Rental	Day		4.00	250.00	1	1,000.00	0.00	240.00	1,240.00
Fire Breaks	Esfera Stan Cole	C. Hours		3.00	100.00	1	300.00	0.00	72.00	372.00
Fire Breaks	Weed Whack Fuel	C. Hours		80.00	34.00	1	2,720.00	0.00	652.80	3,372.80
Irrigation System,	Water Meter	Month		1.00	100.00	1	100.00	0.00	24.00	124.00
Sub total							13,909.32	0.00	3,338.23	17,247.55

NOTE: Because the values are rounded, there may be small errors.

Budget Task Detail

La Costa Villages

Annual Budget for Yr 2008-2009

Ongoing Expenses

09/22/2008

Task list	Specific Description	Unit	Reinvestment	Quantity	Rate	Num Yrs	Cost	Contingency	Administration	Total Cost
Habitat Restoration										
Irrigation System	Hand Water Cont.	L. Hours		20.00	33.55	1	671.00	0.00	161.04	832.04
Irrigation System	Hand Water Cont.	L. Hours		20.00	42.23	1	844.60	0.00	202.70	1,047.30
Plant Procurement	Propagate ACIL	L. Hours		10.00	33.55	1	335.50	0.00	80.52	416.02
Sub total							1,851.10	0.00	444.26	2,295.36
Office Maintenance										
Office Supplies,	Supplies	Year		1.00	486.00	1	486.00	0.00	116.64	602.64
Preserve Office	Annual Rent	Year		1.00	937.44	1	937.44	0.00	224.98	1,162.42
Preserve Office	Office Maintenance	L. Hours		30.00	33.55	1	1,006.50	0.00	241.56	1,248.06
Preserve Office	Office Maintenance	L. Hours		30.00	42.23	1	1,266.90	0.00	304.05	1,570.95
Telephone	Telephone, cell,	Year		1.00	522.00	1	522.00	0.00	125.28	647.28
Sub total							4,218.84	0.00	1,012.52	5,231.36
Operations										
Audit	Audit-cost share	Acre		1.00	639.00	1	639.00	0.00	153.36	792.36
Conferences	Conferences and	L. Hours		9.00	28.13	1	253.17	0.00	60.76	313.93
Conferences	Conferences and	L. Hours		7.00	42.23	1	295.61	0.00	70.94	366.55
Conferences	Conferences and	L. Hours		9.00	33.55	1	301.95	0.00	72.46	374.41
Insurance	General	Year		1.00	678.65	1	678.65	0.00	162.87	841.52
Research &	Bioone	Year		1.00	59.13	1	59.13	0.00	14.19	73.32
Taxes Or Fees	Property Taxes	Annual		1.00	2,531.44	1	2,531.44	0.00	607.54	3,138.98
Travel	Lodging	Person		1.00	90.00	1	90.00	0.00	21.60	111.60
Travel	Lodging (retreat)	Person		1.00	400.00	1	400.00	0.00	96.00	496.00
Travel	Vacation, sick,	L. Hours		35.00	28.13	1	984.55	0.00	236.29	1,220.84
Travel	Vacation, sick,	L. Hours		36.00	33.55	1	1,207.80	0.00	289.87	1,497.67
Travel	Vacation, sick,	L. Hours		40.00	42.23	1	1,689.20	0.00	405.40	2,094.60
Sub total							9,130.50	0.00	2,191.32	11,321.82

NOTE: Because the values are rounded, there may be small errors.

Budget Task Detail

La Costa Villages

Annual Budget for Yr 2008-2009

Ongoing Expenses

09/22/2008

Task list	Specific Description	Unit	Reinvestment	Quantity	Rate	Num Yrs	Cost	Contingency	Administration	Total Cost
Public Services										
Community Outreach	Eagle Scout	L. Hours		6.00	33.55	1	201.30	0.00	48.31	249.61
Community Outreach	Prepare HOA	L. Hours		6.00	33.55	1	201.30	0.00	48.31	249.61
Interpretive Literature	Prepare kiosk	L. Hours		6.00	33.55	1	201.30	0.00	48.31	249.61
Patrolling	Patrol	L. Hours		150.00	33.55	1	5,032.50	0.00	1,207.80	6,240.30
Patrolling	Patrol	L. Hours		123.00	42.23	1	5,194.29	0.00	1,246.62	6,440.91
Patrolling	Patrol Ranger	L. Hours		100.00	22.50	1	2,250.00	0.00	540.00	2,790.00
Sign	Signs	Unit		20.00	6.00	1	120.00	0.00	28.80	148.80
Sub total							13,200.69	0.00	3,168.16	16,368.85
Reporting										
Agency Report	Position Papers	L. Hours		16.00	33.55	1	536.80	0.00	128.83	665.63
Annual Reports	Summary	L. Hours		12.00	42.23	1	506.76	0.00	121.62	628.38
Annual Reports	Summary	L. Hours		16.00	33.55	1	536.80	0.00	128.83	665.63
Annual Work Plan	Plan And Par	L. Hours		2.00	42.23	1	84.46	0.00	20.27	104.73
Annual Work Plan	Plan And Par	L. Hours		6.00	33.55	1	201.30	0.00	48.31	249.61
Database Management	ACIL Data Input	L. Hours		6.00	28.13	1	168.78	0.00	40.50	209.28
Database Management	BRFI Data Input	L. Hours		16.00	28.13	1	450.08	0.00	108.01	558.09
Database Management	CSS Veg Plot Data	L. Hours		8.00	28.13	1	225.04	0.00	54.00	279.04
Database Management	Oak Woodland	L. Hours		3.00	28.13	1	84.39	0.00	20.25	104.64
GIS/CAD Management	Cadre	C. Hours		4.00	65.00	1	260.00	0.00	62.40	322.40
GIS/CAD Management	Enter GIS data	L. Hours		3.00	42.23	1	126.69	0.00	30.40	157.09
GIS/CAD Management	Enter GIS data	L. Hours		6.00	33.55	1	201.30	0.00	48.31	249.61
Sub total							3,382.40	0.00	811.77	4,194.17

NOTE: Because the values are rounded, there may be small errors.

Budget Task Detail

La Costa Villages

Annual Budget for Yr 2008-2009

Ongoing Expenses

09/22/2008

Task list	Specific Description	Unit	Reinvestment	Quantity	Rate	Num Yrs	Cost	Contingency	Administration	Total Cost
Site Construction/Maint.										
Fence	Barbed Wire	Item		1.00	70.00	1	70.00	0.00	16.80	86.80
Fence	Barbed Wire Clips	Unit		5.00	1.80	1	9.00	0.00	2.16	11.16
Fence	Labor	L. Hours		8.00	28.13	1	225.04	0.00	54.00	279.04
Fence	Labor	L. Hours		16.00	33.55	1	536.80	0.00	128.83	665.63
Fence	T-posts	Unit		40.00	3.00	1	120.00	0.00	28.80	148.80
Fence	Choumass Pappas	Item		1.00	200.00	1	200.00	0.00	48.00	248.00
Fence	Choumass Pappas	L. Hours		5.00	28.13	1	140.65	0.00	33.75	174.40
Fence	Choumass Pappas	L. Hours		5.00	33.55	1	167.75	0.00	40.26	208.01
Sub total							1,469.24	0.00	352.61	1,821.85
Sub Total for All Categories							58,820.01	0.00	14,116.80	72,936.81

NOTE: Because the values are rounded, there may be small errors.

Budget Task Detail

University Commons

Annual Budget for Yr 2008-2009

Ongoing Expenses

09/22/2008

Task list	Specific Description	Unit	Reinvestment	Quantity	Rate	Num Yrs	Cost	Contingency	Administration	Total Cost
Biotic Surveys										
General Wildlife	Wildlife Camera	L. Hours		8.00	33.55	1	268.40	0.00	64.41	332.81
Plant Ecologist	CSS Veg Plots	L. Hours		16.00	28.13	1	450.08	0.00	108.01	558.09
Plant Ecologist	CSS Veg Plots	L. Hours		16.00	33.55	1	536.80	0.00	128.83	665.63
Plant Ecologist	Iva, Spiny Rush,	L. Hours		4.00	33.55	1	134.20	0.00	32.20	166.40
Plant Ecologist	Muilla and	L. Hours		4.00	33.55	1	134.20	0.00	32.20	166.40
Science Director	Coordination/Overs	L. Hours		15.00	55.00	1	825.00	0.00	198.00	1,023.00
Sub total							2,348.68	0.00	563.68	2,912.36
Field Equipment										
Field Clothes	Uniform	Item		1.00	42.00	1	42.00	0.00	10.08	52.08
Field Clothes	Boots	Item		1.00	200.00	1	200.00	0.00	48.00	248.00
Power Tools	Misc. Tools	Year		1.00	80.00	1	80.00	0.00	19.20	99.20
Vehicle	Transportation	Mile		3,000.00	0.99	1	2,970.00	0.00	712.80	3,682.80
Sub total							3,292.00	0.00	790.08	4,082.08
General Maintenance										
Sanitation Control	Dumpster	Month		1.00	103.00	1	103.00	0.00	24.72	127.72
Sub total							103.00	0.00	24.72	127.72
Habitat Maintenance										
Exotic Plant Control	Backpack Spray	L. Hours		16.00	33.55	1	536.80	0.00	128.83	665.63
Exotic Plant Control	Weed Whack	Item		200.00	28.00	1	5,600.00	0.00	1,344.00	6,944.00
Irrigation System,	Water Meter	Month		1.00	100.00	1	100.00	0.00	24.00	124.00
Sub total							6,236.80	0.00	1,496.83	7,733.63

NOTE: Because the values are rounded, there may be small errors.

Budget Task Detail

University Commons

Annual Budget for Yr 2008-2009

Ongoing Expenses

09/22/2008

Task list	Specific Description	Unit	Reinvestment	Quantity	Rate	Num Yrs	Cost	Contingency	Administration	Total Cost
Office Maintenance										
Office Supplies,	Supplies	Year		1.00	216.00	1	216.00	0.00	51.84	267.84
Preserve Office	Annual Office Rent	Year		1.00	416.64	1	416.64	0.00	99.99	516.63
Preserve Office	Office Maintenance	L. Hours		12.00	42.23	1	506.76	0.00	121.62	628.38
Preserve Office	Office Maintenance	L. Hours		20.00	33.55	1	671.00	0.00	161.04	832.04
Telephone	Telephone, cell,	Year		1.00	232.00	1	232.00	0.00	55.68	287.68
Sub total							2,042.40	0.00	490.17	2,532.57
Operations										
Audit	Audit-cost share	Acre		1.00	305.37	1	305.37	0.00	73.28	378.65
Conferences	Conferences and	L. Hours		4.00	28.13	1	112.52	0.00	27.00	139.52
Conferences	Conferences and	L. Hours		3.00	42.23	1	126.69	0.00	30.40	157.09
Conferences	Conferences and	L. Hours		4.00	33.55	1	134.20	0.00	32.20	166.40
Insurance	General	Year		1.00	431.49	1	431.49	0.00	103.55	535.04
Research &	Bioone	Year		1.00	26.52	1	26.52	0.00	6.36	32.88
Taxes Or Fees	Property Taxes	Annual		1.00	1,974.61	1	1,974.61	0.00	473.90	2,448.51
Travel	Lodging	Person		1.00	40.00	1	40.00	0.00	9.60	49.60
Travel	Lodging (retreat)	Person		1.00	178.00	1	178.00	0.00	42.72	220.72
Travel	Vacation, sick,	L. Hours		15.00	28.13	1	421.95	0.00	101.26	523.21
Travel	Vacation, sick,	L. Hours		16.00	33.55	1	536.80	0.00	128.83	665.63
Travel	Vacation, sick,	L. Hours		18.00	42.23	1	760.14	0.00	182.43	942.57
Sub total							5,048.29	0.00	1,211.58	6,259.87

NOTE: Because the values are rounded, there may be small errors.

Budget Task Detail

University Commons

Annual Budget for Yr 2008-2009

Ongoing Expenses

09/22/2008

Task list	Specific Description	Unit	Reinvestment	Quantity	Rate	Num Yrs	Cost	Contingency	Administration	Total Cost
Public Services										
Access Control	Patrol	L. Hours		60.00	33.55	1	2,013.00	0.00	483.12	2,496.12
Access Control	Patrol	L. Hours		50.00	42.23	1	2,111.50	0.00	506.76	2,618.26
Sign	Signs	Unit		10.00	6.00	1	60.00	0.00	14.40	74.40
Sub total							4,184.50	0.00	1,004.28	5,188.78
Reporting										
Annual Reports	Summary	L. Hours		12.00	42.23	1	506.76	0.00	121.62	628.38
Annual Reports	Summary	L. Hours		16.00	33.55	1	536.80	0.00	128.83	665.63
Annual Work Plan	Plan And Par	L. Hours		2.00	42.23	1	84.46	0.00	20.27	104.73
Annual Work Plan	Plan And Par	L. Hours		4.00	33.55	1	134.20	0.00	32.20	166.40
Database Management	CSS Veg Plot Data	L. Hours		6.00	28.13	1	168.78	0.00	40.50	209.28
GIS/CAD Management	Cadre GIS	C. Hours		4.00	65.00	1	260.00	0.00	62.40	322.40
Management Plan	position paper	L. Hours		6.00	33.55	1	201.30	0.00	48.31	249.61
Monitoring Reports	CE Compliance	L. Hours		6.00	33.55	1	201.30	0.00	48.31	249.61
Sub total							2,093.60	0.00	502.46	2,596.06
Sub Total for All Categories							25,349.27	0.00	6,083.82	31,433.09

NOTE: Because the values are rounded, there may be small errors.

Budget Task Detail

Elfin Forest

Annual Budget for Yr 2008-2009

Ongoing Expenses

09/22/2008

Task list	Specific Description	Unit	Reinvestment	Quantity	Rate	Num Yrs	Cost	Contingency	Administration	Total Cost
Biotic Surveys										
Plant Ecologist	CSS monitoring	L. Hours		8.00	28.13	1	225.04	0.00	54.00	279.04
Plant Ecologist	CSS monitoring	L. Hours		8.00	33.15	1	265.20	0.00	63.64	328.84
Science Director	Coordination/Overs	L. Hours		5.00	50.00	1	250.00	0.00	60.00	310.00
Sub total							740.24	0.00	177.65	917.89
Field Equipment										
Power Tools	Misc. Tools	Item		1.00	20.00	1	20.00	0.00	4.80	24.80
Vehicle	Transportation	Mile		450.00	0.99	1	445.50	0.00	106.92	552.42
Sub total							465.50	0.00	111.72	577.22
General Maintenance										
Dump Fees	Dump Fee	Item		1.00	25.00	1	25.00	0.00	6.00	31.00
Sub total							25.00	0.00	6.00	31.00
Habitat Maintenance										
Exotic Plant Control	Kill Eucs & others	Acre		12.00	33.15	1	397.80	0.00	95.47	493.27
Sub total							397.80	0.00	95.47	493.27
Office Maintenance										
Office	Office rent	Item		1.00	104.16	1	104.16	0.00	24.99	129.15
Office Supplies,	Office supplies	Item		1.00	54.00	1	54.00	0.00	12.96	66.96
Preserve Office	Office time	L. Hours		14.00	33.15	1	464.10	0.00	111.38	575.48
Telephone Charges,	Telephone	Item		1.00	58.00	1	58.00	0.00	13.92	71.92
Sub total							680.26	0.00	163.26	843.52

NOTE: Because the values are rounded, there may be small errors.

Budget Task Detail

Elfin Forest

Annual Budget for Yr 2008-2009

Ongoing Expenses

09/22/2008

Task list	Specific Description	Unit	Reinvestment	Quantity	Rate	Num Yrs	Cost	Contingency	Administration	Total Cost
Operations										
Audit	Audit	Item		1.00	71.00	1	71.00	0.00	17.04	88.04
Employee Training	Retreat/confernces	Item		1.00	55.00	1	55.00	0.00	13.20	68.20
Insurance	Liability/conserv.	Item		1.00	314.52	1	314.52	0.00	75.48	390.00
Project Accounting	Retreat/conf/hol/va	L. Hours		5.00	28.13	1	140.65	0.00	33.75	174.40
Project Accounting	Retreat/conf/hol/va	L. Hours		5.00	33.15	1	165.75	0.00	39.78	205.53
Project Accounting	Retreat/conf/hol/va	L. Hours		5.00	42.23	1	211.15	0.00	50.67	261.82
Research &	BioOne	Item		1.00	20.00	1	20.00	0.00	4.80	24.80
Sub total							978.07	0.00	234.73	1,212.80
Public Services										
Access Control	Enforcement	L. Hours		32.00	33.15	1	1,060.80	0.00	254.59	1,315.39
Sub total							1,060.80	0.00	254.59	1,315.39
Reporting										
Agency Report	Annual Report	L. Hours		2.00	42.23	1	84.46	0.00	20.27	104.73
Annual Reports	Summary	L. Hours		4.00	33.15	1	132.60	0.00	31.82	164.42
Annual Work Plan	Plan And Par	L. Hours		4.00	33.15	1	132.60	0.00	31.82	164.42
Monitoring Reports	CE compliance	L. Hours		8.00	33.15	1	265.20	0.00	63.64	328.84
Sub total							614.86	0.00	147.56	762.42
Sub Total for All Categories							4,962.53	0.00	1,191.00	6,153.53

NOTE: Because the values are rounded, there may be small errors.

Budget Task Detail

Cassia

Annual Budget for Yr 2008-2009

Ongoing Expenses

09/22/2008

Task list	Specific Description	Unit	Reinvestment	Quantity	Rate	Num Yrs	Cost	Contingency	Administration	Total Cost
Biotic Surveys										
Plant Ecologist	Css and sensitive	L. Hours		8.00	33.55	1	268.40	0.00	64.41	332.81
Sub total							268.40	0.00	64.41	332.81
Field Equipment										
Power Tools	Misc. Tools	Item		1.00	10.00	1	10.00	0.00	2.40	12.40
Vehicle	Transportation	Mile		200.00	0.99	1	198.00	0.00	47.52	245.52
Sub total							208.00	0.00	49.92	257.92
General Maintenance										
Dumpster, Rental	10 C.y.	Week		1.00	25.00	1	25.00	0.00	6.00	31.00
Sub total							25.00	0.00	6.00	31.00
Habitat Maintenance										
Exotic Plant Control	Backpack Spray	L. Hours		4.00	33.55	1	134.20	0.00	32.20	166.40
Sub total							134.20	0.00	32.20	166.40
Office Maintenance										
Office	Office work	L. Hours		4.00	42.23	1	168.92	0.00	40.54	209.46
Office	Office work	L. Hours		10.00	33.55	1	335.50	0.00	80.52	416.02
Office Rent	Home Office Rent	Not Assigned		1.00	52.08	1	52.08	0.00	12.49	64.57
Office Supplies,	Supplies	Item		1.00	27.00	1	27.00	0.00	6.48	33.48
Telephone	Telephone	Item		1.00	29.00	1	29.00	0.00	6.96	35.96
Sub total							612.50	0.00	147.00	759.50

NOTE: Because the values are rounded, there may be small errors.

Budget Task Detail

Cassia

Annual Budget for Yr 2008-2009

Ongoing Expenses

09/22/2008

Task list	Specific Description	Unit	Reinvestment	Quantity	Rate	Num Yrs	Cost	Contingency	Administration	Total Cost
Operations										
Audit	Audit-cost share	Item		1.00	36.00	1	36.00	0.00	8.64	44.64
Budgeting	BioOne	Item		1.00	25.00	1	25.00	0.00	6.00	31.00
Conferences	Retreat/Conference	Item		1.00	27.00	1	27.00	0.00	6.48	33.48
Insurance	Liability/fee	Acre		1.00	300.62	1	300.62	0.00	72.14	372.76
Project Accounting	vac/holi/retreat/con	L. Hours		3.00	28.13	1	84.39	0.00	20.25	104.64
Project Accounting	vac/holi/retreat/con	L. Hours		3.00	33.55	1	100.65	0.00	24.15	124.80
Project Accounting	vac/holi/retreat/con	L. Hours		3.00	42.23	1	126.69	0.00	30.40	157.09
Sub total							700.35	0.00	168.08	868.43
Public Services										
Access Control	Enforcement	L. Hours		12.00	33.55	1	402.60	0.00	96.62	499.22
Sub total							402.60	0.00	96.62	499.22
Reporting										
Agency Report	Annual Report	L. Hours		4.00	33.55	1	134.20	0.00	32.20	166.40
Annual Work Plan	Plan And Par	L. Hours		4.00	33.55	1	134.20	0.00	32.20	166.40
Management Plan	Revise HMP	L. Hours		20.00	33.55	1	671.00	0.00	161.04	832.04
Sub total							939.40	0.00	225.45	1,164.85
Sub Total for All Categories							3,290.45	0.00	789.70	4,080.15

NOTE: Because the values are rounded, there may be small errors.

Appendix 3: HCA Location Maps

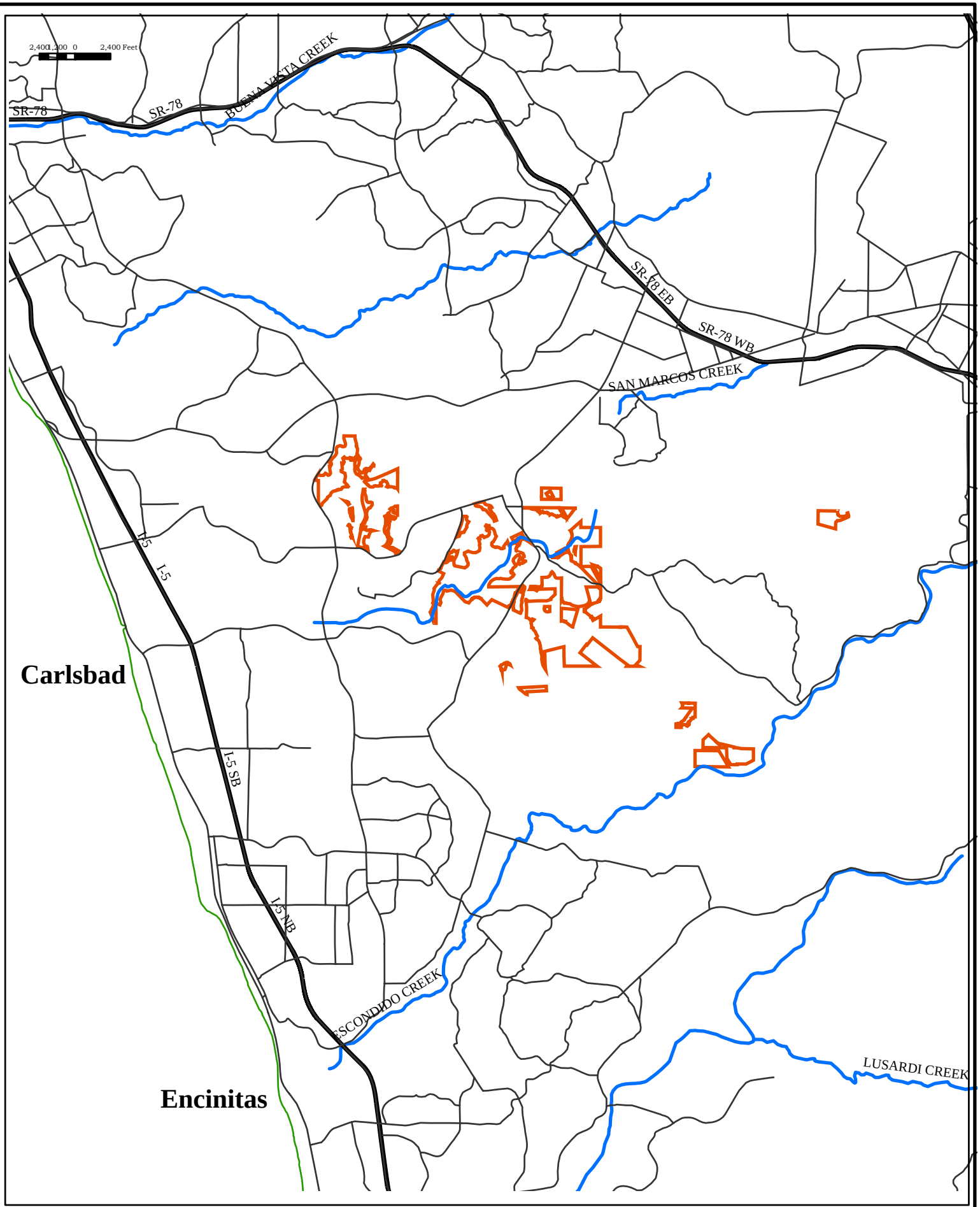

Figure 1
Preserve Vicinity
Rancho La Costa Habitat Conservation Area

Center for Natural Lands Management

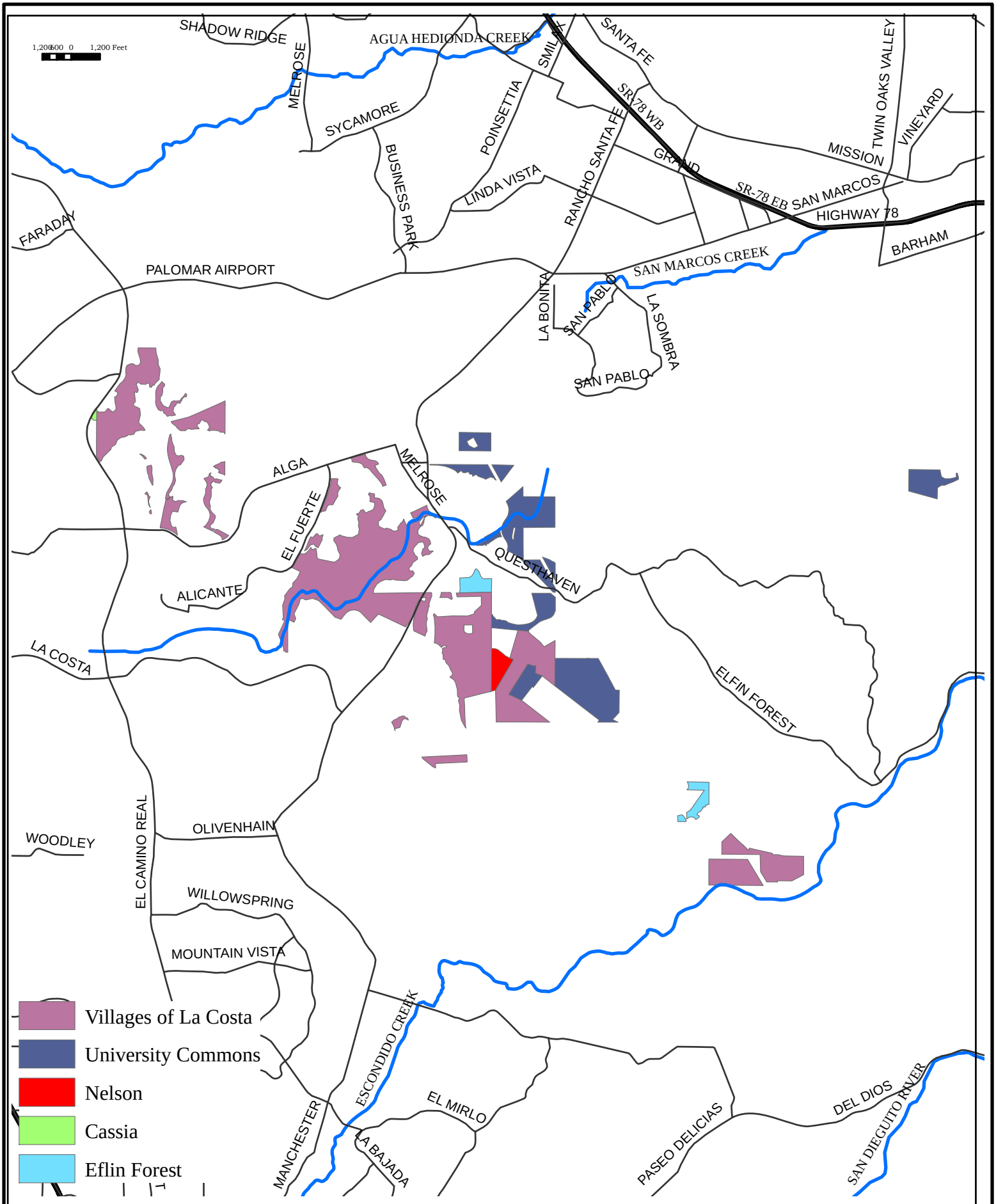

Figure 2
Preserve Location
Rancho La Costa Habitat Conservation Area

Center for Natural Lands Management

Appendix 4: Research Proposal for the Herbicide Application of Fusilade to thread-leaved brodiaea (*Brodiaea filifolia*)

RESEARCH PROPOSAL FOR THE HERBICIDE APPLICATION OF FUSILADE TO THREAD-LEAVED BRODIAEA (*Brodiaea filifolia*)

Submitted to: Rare Plant Program
Habitat Conservation Branch
Department of Fish and Game
1416 Ninth Street
Sacramento, Ca 95814

Submitted by: Markus Spiegelberg, Jessica Vinje, and Deborah Rogers
The Center for Natural Lands Management
215 West Ash Street
Fallbrook, Ca 92028
760-731-7790
cnlmmarkus@cox.net; jvinje@cnlm.org; debrogers@ucdavis.edu

Date: November 2, 2007

Re: Thread-leaved Brodiaea (*Brodiaea filifolia*)

1. Principle Investigators: Markus Spiegelberg, Jessica Vinje, Patrick McConnell, and Deborah Roberts

2. Purpose of the Study:

The Center for Natural Lands Management (CNLM) manages over 4,000 acres of natural areas in San Diego County in perpetuity. A common threat to our preserves is nonnative plant species. CNLM manages four populations of the state-endangered and federally- threatened thread-leaved brodiaea (BRFIL) in Carlsbad, California. The dominant vegetation community that these populations occur in, nonnative grassland, is heavily infested with purple-false brome (*Brachypodium distachyon*), as well as other nonnative grass species. Although native grass species are present, their cover has been significantly reduced, most likely by the invasion of these nonnative plant species.

The goal of this project is to find a cost effective and successful approach to managing (limiting cover) nonnative grasses to allow us to enhance these areas and to protect, and potentially enhance, populations of BRFIL. CNLM is proposing a study that uses the monocot and grass specific herbicide, Fusilade, to control nonnative grasses. We are also testing the effect of removing dried nonnative grass thatch as another experimental treatment.

Since BRFIL is a listed species, CNLM is requesting permission to test Fusilade on BRFIL individuals.

In sum, the need to remove nonnative grasses is a necessary management task that will allow us to better protect BRFIL populations and enhance and restore the nonnative grasslands to native grasslands. If Fusilade is found to be effective at killing nonnative grasses and not harming BRFIL, CNLM will have found a cost effective management tool for this species. In addition, we will be able to disseminate this research information to other managers of this species. If Fusilade is found to be harmful to BRFIL, the impact to the species in this area would be extremely minimal.

3. Location of the Study Site

In February 2007, CNLM established a pilot study at several of the BRFIL populations located on the Rancho La Costa Habitat Conservation Area (HCA) (Figure 1), specifically located in an area called “The Greens” (Figure 2). The Greens is part of the Rancho La Costa HCA that was set aside as mitigation for the La Costa Villages project under the Multiple Habitat Conservation Plan (MHCP) for North San Diego County. The area and the BRFIL populations are also covered under the City of Carlsbad’s Subarea Plan as part of the MHP. California Natural Diversity Database BRFIL element occurrences 33 and 34 are located on the Greens. The pilot study is located in these element occurrences. Only BRFIL occurs at the Greens. No other Brodiaea species occur at the Greens.

4. Methods

Management Objective

Increase, or protect a stable mean density of BRFIL and decrease the percent cover of nonnative grasses.

Survey Design and Sampling Methodology

CNLM is proposing to apply Fusilade to one of the established subplots (described in Survey Design and Sampling Methodology below) in February 2008. The subplot contains approximately 50 BRFIL.

Three macroplots (Macroplots #1 through #3; Figure 3) were established at the Greens in February 2007. Each macroplot was placed in areas known to support BRFIL. These macroplots were placed across the slope topography (perpendicular to the slopes). A balanced randomized complete block design was used to stratify the treatments (Figure 1). Each macroplot contains sixteen subplots, with four replicates of each treatment. Each subplot occupies an area of 1 meter by 10 meters. These rectangular belt subplots were chosen to better capture the clumped distribution of BRFIL. The treatments would consist of: 1) Fusilade application according to the label 2) Fusilade application plus dethatching of dried litter material 3) Dethatching of dried litter material only and 4) control (no Fusilade application or dethatching).

Monitoring will occur two times per year, once to capture vegetative BRFIL (February data collection) and once to capture flowering BRFIL (May data collection). This would help us to determine the true population of BRFIL in the study areas since less than 10-percent of the true population is estimated to bloom in any given year. It will also allow us to assess the effect of Fusilade on the vegetative portion of BRFIL.

The data collection would span a seven-year time frame to account for weather variation and fluctuation. The first two years (2007 and 2008) would be pilot study years. Data collection and Fusilade application to one subplot would occur in early 2008, as mentioned above. Eight total years of data collection would occur with modifications to the sampling objectives and/or sampling methodology, if necessary, after assessing the results of the first two pilot years.

Within each subplot a direct vegetative count of BRFIL was conducted in February 2007 and a direct flowering count was conducted in May 2007. Species richness was collected by recording all species encountered within each subplot. Percent cover by species was collected in each subplot using a 0.5 by 1 meter quadrat placed at random intervals on the right and left hand sides of a meter tape placed in the middle of each subplot. Three quadrats were read per subplot, and placement of the quadrat on either side of the measuring tape was determined with the flip of a coin. The quadrat contained 36 points, located when metal wires arranged within the quadrat intersected at one decimeter intervals, thus supplying 108 total points per subplot for estimating percent vegetative and ground cover. Vegetative cover was recorded by species. Ground cover was recorded as either bare ground or litter. Bare ground was further characterized as whether or not gopher activity had occurred recently below each pair of intersecting wires. Likewise, litter was characterized as former live vegetation lying directly on the ground as thatch, or rabbit droppings.

Dethatching of dried litter material occurred in October 2007 in order to avoid affecting BRFIL during its vegetative, flowering, or seeding stages.

Statistical Methodology

Four attributes are being measured. These include percent cover, direct counts of vegetative and flowering BRFIL, and species richness. Average number of vegetative and flowering BRFIL will be calculated per macroplot, as will average percent cover by category (litter, bare, cover by species), and average species richness by category (native, non-native). From this, repeated measures ANOVA will be performed

annually on these attributes after the first year's analysis is conducted in 2009. Analyses will also be run for site differences.

The potential effect of location has best been accounted for by stratifying the random placement of experimental units throughout each macroplot, and each of the three sites. Site effect will be analyzed despite this, and if no significant effect of site is determined, the variable SITE will be dropped from the analyses.

The null hypothesis is that there will be no difference between controls and experimental manipulation plots. The null hypothesis will be rejected if there is a difference in any of the response variables categorized by treatment. The null hypothesis will be rejected if the resulting probability (p) that the results are due to chance outcome alone (thus likely not due to treatment) is less than 5 percent ($p < .05$). An ad-hoc test will be run in order to identify which treatments differ, and graphics will be produced which carefully illustrate the emergent patterns.

5. Impact to State-listed Plants

The population of BRFIL at the Greens was estimated at 4,610 individuals prior to CNLM taking fee title to the property and commencing management. However, CNLM has established that there are well over 11,000 plants located in these specific study areas at the Greens based on the 2007 survey of BRFIL. CNLM is confident in saying that there are between 15,000 and 20,000 BRFIL that likely occur in areas occupied by BRFIL at the Greens.

CNLM is proposing to apply Fusilade to one of the established subplots (described in Survey Design and Sampling Methodology above) in February 2008. Application of Fusilade must occur during the same time that the BRFIL is emerging and in the vegetative state (which occurs from approximately November/December through March/April). This is necessary because this is when the nonnative grasses are also emerging and are approximately the correct age and height for Fusilade application to be effective. In other words, if the Fusilade is applied to early (when the plants are too small) or too late (after the grasses have flowered and set seed), there will be no effect to the nonnative grasses. Avoidance of BRFIL is not possible for this research proposal. The subplot where Fusilade application would occur contains approximately 50 BRFIL. If Fusilade is determined to be toxic to BRFIL, it would result in the loss of approximately 0.005 percent of the BRFIL that occur in the study macroplots at the Greens, or a total of 50 thread-leaved brodiaea plants.

If Fusilade is found not to be toxic to BRFIL, it would be applied within all our study macroplots in February 2009.

6. Schedule of Work

Task	Timeline
collect data	February and May 2007 - 2014
set up pilot experiment	February 2007
apply herbicide	February 2008
dethatch subplots	September 2007 - 2014
Reporting	December 2007 - 2014

7. Reports

An annual report will be submitted to the Department of Fish and Game in December of each year and a final report will be submitted in December of 2014.

8. Other Relevant Information

Currently, Fusilade is thought to not affect bulb or corm monocot species, according to Carl Bell, Regional Advisor-Invasive Plants at the University of California, Davis, Cooperative Extension-County of San Diego. Additionally, Carl Bell performed a similar experiment with Mr. John Eckoff of the California Department of Fish and Game in

the spring of 2007. The results of this study are not known yet, but Mr. Bell feels that the Fusilade likely did not kill the thread-leaved brodiaea. Confirming this hypothesis will not occur until spring 2008. Conversely, Mr. Mike Kelly, of Kelly & Associates, Inc. conducted a similar experiment in 2007 on surrogate bulb and corm species using Fusilade and did note some browning of leaves on the surrogate species (*Muilla maritima*, *Dichelostemma capitatium*, *Allium* spp., etc.); however, the results of his experiment will not be known until early 2008.

Appendix 5: CSS Monitoring Plan

The Center for Natural Lands Management-San Diego: Coastal Sage Scrub Monitoring Plan

Objective: Track the changes in structure and composition of the coastal sage scrub (CSS) community.

a. Use data to evaluate the structure and composition of the CSS vegetation community and its correlation to predictions of vegetation changes based on theories postulated by ecological and threats models.
b. Use data to evaluate changes or trends in "populations", presence/absence and/or occupied/unoccupied habitat of sensitive animal species, primarily the coastal California gnatcatcher (*Polioptila californica californica*)(CAGN).
c. Use data to evaluate changes in plant diversity.
d. Use data to evaluate changes over time from a baseline vegetation pattern.
e. Use data to guide vegetation management decisions (i.e. nonnative plant removal, rare species. range increases/introductions).

Background of Need:

The Center for Natural Lands Management (CNLM) manages several thousand acres of CSS in San Diego County. These areas host several threatened, endangered and sensitive plant and wildlife species, provide key locations for wildlife movement and are some of the last remaining stands of CSS in coastal San Diego. These areas were also specifically designated as important areas to conserve as part of regional Habitat Conservation Planning (HCP) conservation efforts.

As a result, the CNLM needs to be able to evaluate recruitment and vigor of this vegetation community over time to guide management decisions and to evaluate changes in plant and animal communities. This monitoring will also provide an opportunity to evaluate theorized predictions of changes in vegetation communities resulting from urbanization, nonnative species invasion, global warming, increased edge, altered fire regime and fragmentation (to name a few).

Background of Ecological Model and Threats

CSS is a fire-adapted vegetation community with fires occurring naturally, but most severely under the extreme Santa Ana heat and winds of late summer and fall and during drought conditions. During these conditions there would generally be a "complete burn" where all above ground vegetation within the fire's path would be consumed. After such a fire, herbaceous plants (fire followers), which are known to sprout after fires, would dominate the landscape for a few years. Over time (3-5 years) the shrub lands would regain their dominance, and after 5-10 years a mature assemblage of plants and wildlife would again be found on site (Dallman 1998).

The fire frequency in CSS is as frequent as chaparral due to the volatile oils and resins that occur in CSS plants. The plants, such as white sagebrush (*Saliva apiana*), are able to resprout after a fire or produce many seedlings from the dormant seed bank that lies in the soil. Seed germination of some species may also be stimulated by fire (Holland and Keil 1995, Dallman

1998). However, if the fire frequency and intensity are too great, plants in the CSS community, such as black sage (*Salvia mellifera*) and California sagebrush (*Artemisia californica*) are permanently killed and can no longer regenerate, slowly converting the CSS community to a nonnative, annual grassland (Southwest Division, Naval Facilities Engineering Command 1998).

Each CNLM preserve in San Diego has a different fire history and a different predicted fire future. For example, most of the Rancho La Costa (RLC) Habitat Conservation Area (HCA) burned in the Harmony Grove fire in October of 1996, while the Manchester HCA has not burned (except two very small fires) in its entirety since 1917. Prior to 1917 no data are recorded, so it is uncertain as to when the last significant fire event occurred in the Manchester HCA.

Regardless of fire history and the current vegetation characteristics, there are many realized or potential threats to the integrity of the CSS vegetation community (See RLC Habitat Management Plan CSS Ecological Model and Threats Section) that need to be evaluated:

1. What is the effect of the altered fire regime at each HCA?
2. What is the potential effect of global climate change?
3. What are the effects of urban edge?
4. What are the effects of fragmentation and isolation?
5. What are the effects of altered wildlife usage patterns?

These threats questions lead to other questions associated with their effect on ecological processes and patterns:

1. Are the variables investigated representing a threat?
2. At what spatial scale are the variables representing a threat?
3. How do the effects of the threats listed above effect the distribution and abundance of sensitive plant and wildlife species?
4. How do the threats listed above effect the distribution of non-sensitive plants and animals?
5. How do the effects of each threat alter ecological processes?
6. How do the various measured factors interact?

Predictions

Fire. We predict that as a result of fragmentation, complete burns of preserves are now less likely and there will be fewer, smaller fires resulting in a mosaic of CSS with various age structures.

Global Climate Change. We predict that rainfall patterns will change (likely decrease) over the next 100 years resulting in a lengthening of the fire season, frequency of lightening fires, frequency of drought, and areas burned. We predict:

1. Possible regime shifts (altered abundance and recruitment patterns in various native vegetation assemblages)

2. Altered invasion severity of exotic species due to changes from native-adapted variations in weather phenomena
3. Lowered seedling survival of species due to changes from native-adapted variations in weather phenomena
4. Lowered seed and/or clonal production of future generations due to changes from native-adapted variations in weather phenomena
5. Negative interactions between native wildlife and changes resulting from the above mentioned predictions in vegetative cover

Habitat Fragmentation and Urban Edge. We predict that habitat fragmentation will reduce plant diversity and migration and/or genetic exchange between plant populations. This could affect the CSS community by reducing vigor within populations and eventually leading to extinctions of specific plant species.. Habitat fragmentation has resulted in an increase of urban edge on all our preserves. We predict that this will result in increased pressures from nonnative plant species, illegal vegetation clearing, dumping, erosion, and other threats that will change the vegetation structure and composition.

Monitoring Methodology

Approximately fifty plots will be established inside three of our preserves, and the number per preserve allocated by the amount of acreage currently occupied by CSS in each preserve. These plots will be placed in a stratified random manner across our preserves. Stratification will take into account:

1. Size of preserve
2. Slope and aspect
3. Distance from preserve edge/urban edge
4. Presence or absence of CAGN or San Diego horned lizard (*Phrynosoma coronatum blainvillii*)
5. Fire history

Plot Design and Setup

The plot design will be of a modified Whittaker nested vegetation sampling design as in Stohlgren et al. 1995. The dimensions of the macroplot will be 50 meters long by 20 meters wide. Three smaller nested plots will be placed inside the macroplot. The larger of these three is to be 20 meters long and 5 meters wide, placed in the center of the macroplot, with the long axis corresponding to that of the macroplot. The two other nested plots will be at opposite corners of the macroplot, and will be 5 by 2 meters in length, again with the long axis corresponding to that of the macroplot. The design of the modified Whittaker plot we are using deviates from that described in Stohlgren et al. 1995 by not including the 12 smaller 1- square meter rectangles. The long axis of the modified Whittaker plots will be set to cross the environmental gradient present. Sampling will be carried out for both continuous variables (percent cover by species, perennial species height), non-parametric and semi-continuous variables (count of shrub seedlings, species presence).

Point Intercept Data

Percent cover by species will be gathered by running a point-intercept transect along one or both long borders of the macroplots. In addition to species cover, height measurements will be collected for all perennial species measured as a "hit" along the transects. The point-intercept transects will be measured at half meter intervals, thus generating 98 "hits" along one or each long side of the macroplot. Living plants will count as a point or "hit," if a 1.5 millimeter dowel is intersected in the vertical plane by the living tissue of a plant. At each half meter, data pertaining to bare ground, rock, or litter incident with the dowel will also be collected.

Species Diversity, Recruitment and Mortality

Information gathered inside the plots will include species present in each plot, including the macroplot whole plot. In the two small plots, and in the large central plot, counts of shrub seedlings by species will be documented.

Rational for a Two-Tiered Approach

The data collected in the macroplot, and smaller sub-plots will be useful in generating species area curves and (more importantly) in documenting species presence or absence, as well as recruitment and mortality over time. The advantages of using a multi-scaled approach to quantifying species richness are identified in Stohlgren et al. 1995. As the years progress, small changes in species presence or seedling recruitment may be observed as disappearances, appearances, increases, or decreases on the micro-scale of sub-plot. The appearance of nonnative species may be quickly identified on the macroplot scale, while the disappearance, or lack of recruitment among native shrubs may be apparent on the smaller plot scale prior to any notice of change on the macroplot scale. Another advantage of using smaller nested plots is that it provides an affordable estimate of shrub recruitment and mortality, since attempting to quantify these measures would be very labor-intensive if carried out on the macroplot scale.

The point-intercept transect measures will provide a method of quantifying change in abundance by species that may provide clues that tie into changes in recruitment or mortality among the sub-plot counts and diversity estimates. For instance, nonnative grasses and/or litter cover changes may be predictive as explanatory variables in a multi-factorial analysis of the response variables mortality or species number decline. Other variables that may be tied into a model explaining the measured pattern may include regional rainfall totals for the season and/or seasonal temperature averages, slope and aspect of plots, fire history, and the presence or absence of animal herbivory.

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